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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,301	10/11/2003	William Paynter Hanson	HANS-01	3326
30568	7590	09/08/2004	EXAMINER	
MARY J. GASKIN ANNELIN & GASKIN 2170 BUCKTHORNE PL. SUITE 220 THE WOODLANDS, TX 77380			SINES, BRIAN J	
			ART UNIT	PAPER NUMBER
			1743	
DATE MAILED: 09/08/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/684,301	HANSON, WILLIAM PAYNTER	
	Examiner	Art Unit	
	Brian J. Sines	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-18 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 8 and 9 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

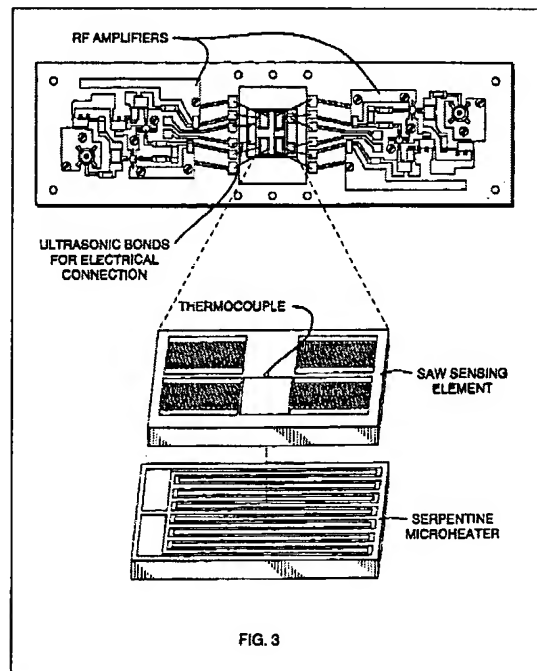
The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1 – 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caron et al. (U.S. Pat. No. 5,992,215 A). Regarding claims 1 – 4, Caron et al. teach a surface acoustic wave sensor apparatus comprising: a piezoelectric quartz crystal resonator substrate having a sensor coating comprising a metal coating, such as gold, silver or copper; an integrated heater element comprising a serpentine microheater; a control circuit for both the heater element and the piezoelectric resonator; and a means for analyzing the data collected from the control circuits (see col. 3, line 10 – col. 9, line 9; figures 1 & 3). The Courts have held that apparatus claims must be structurally distinguishable from the prior art in terms of structure, not function. See *In re Danley*, 120 USPQ 528, 531 (CCPA 1959); and *Hewlett-Packard Co. V. Bausch and Lomb, Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). The Courts have held that the manner of operating

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an apparatus does not differentiate an apparatus claim from the prior art, if the prior art apparatus teaches all of the structural limitations of the claim. See *Ex Parte Masham*, 2 USPQ2d 1647 (BPAI 1987) (see MPEP § 2114).



Caron et al. do not specifically teach a sensor device comprising an array configuration. However, the use of sensor devices comprising an array configuration are well known in the art (see MPEP § 2144.03). Furthermore, the Courts have held that the mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Harza*, 124 USPQ 378 (CCPA 1960) (see MPEP § 2144.04). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate an array of piezoelectric resonators within the sensor device disclosed by Caron et al. Regarding claim 8, Caron et al. do teach the further incorporation of a temperature measurement means comprising a thermometer apparatus, such as a thermocouple, for facilitating temperature sensing and control (see col. 5, lines 53 – 65; figures 3 & 5).

2. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caron et al., as applied to claims 1 – 4 and 8 above, and further in view of Neuberger (U.S. Pat. No.

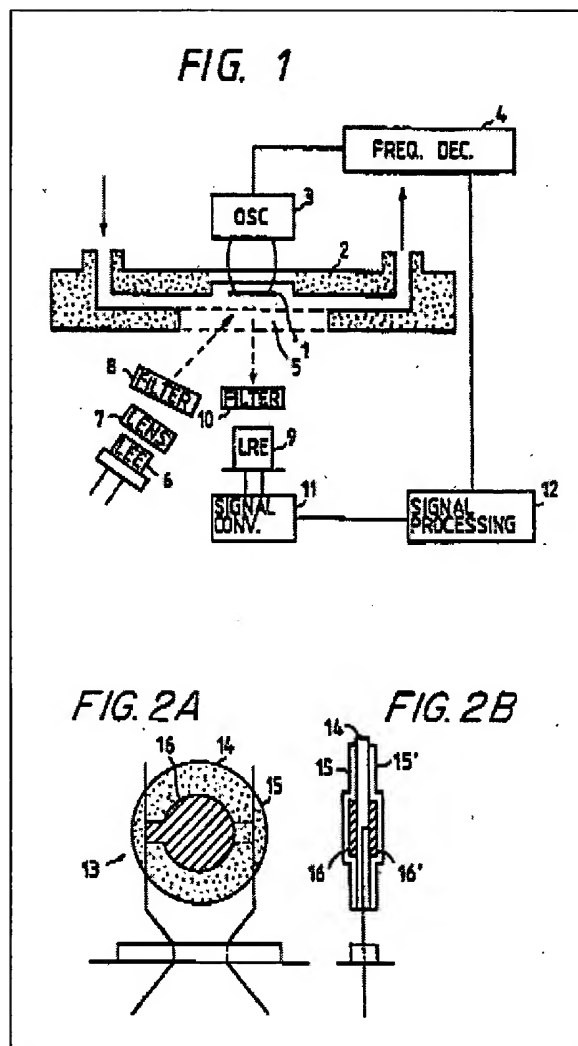
5,065,140). Caron et al. do not specifically teach the incorporation of an alarm means.

However, the use of alarms with gas sensing devices are well known in the art when these devices are utilized in the monitoring and detection of harmful or explosive gaseous substances (see MPEP § 2144.03). For example, Neuberger teaches an alarm means integrated with a gas sensing device incorporating the use of piezoelectric resonators for detecting harmful gases, such as HCl and other halogenated gases (see col. 3, lines 6 – 11; col. 4, lines 7 – 24). Consequently, a person of ordinary skill in the art would have recognized the suitability of utilizing an alarm means, as exemplified by Neuberger, for the intended purpose of indicating the presence of a harmful substance, such as mercury vapor, detected by the Caron et al. gas sensing device (see MPEP § 2144.07). In addition, as evidenced by Neuberger, a person of ordinary skill in the art would accordingly have had a reasonable expectation of success of incorporating such an alarm means with a gas sensing device. The Courts have held that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate such an alarm means, as taught by Neuberger, with the Caron et al. gas sensing apparatus in order facilitate the alarm indication of the detection of a harmful substance.

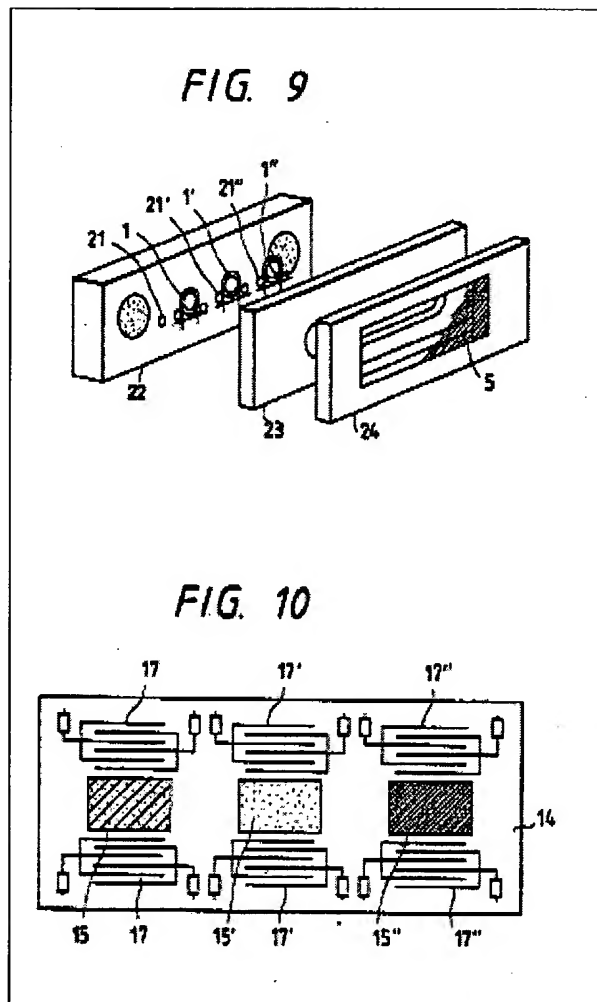
3. Claims 1 – 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuki et al. (U.S. Pat. No. 5,411,709 A) in view of Bloch et al. (U.S. Pat. No. 4,748,367).

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Regarding claims 1 and 2, Furuki et al. teach a sensing apparatus comprising: a piezoelectric quartz resonator (1 & 14) having a sensor coating (15 & 15', e.g., a gas sensitive thin film comprising an organic dye); a control and measurement circuit (3 & 4) for the piezoelectric resonator; and a means (signal processing means 12) for analyzing the data collected from the control circuit for the piezoelectric resonator (see col. 5, line 1 – col. 6, line 37; col. 10, lines 14 – 64; figures 1, 2A & 2B). The Courts have held that apparatus claims must be structurally distinguishable from the prior art in terms of structure, not function. See *In re Danley*, 120 USPQ 528, 531 (CCPA 1959); and *Hewlett-Packard Co. V. Bausch and Lomb, Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). The Courts have held that the manner of operating an apparatus does not differentiate an apparatus claim from the prior art, if the prior art apparatus teaches all of the structural limitations of the claim. See *Ex Parte Masham*, 2 USPQ2d 1647 (BPAI 1987) (see MPEP § 2114).



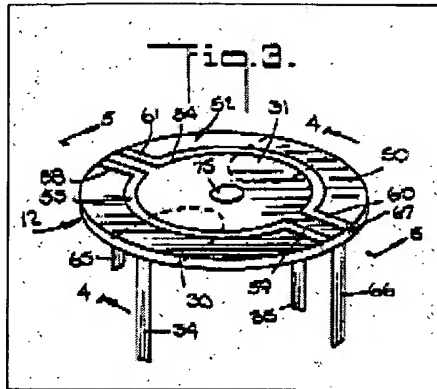
Furuki et al. do teach a sensor device comprising an array configuration having a plurality of gas detecting elements comprising quartz resonators (1, 1' & 1'') (see col. 15, lines 40 – 62; figures 9 & 10).



Furuki et al. do not specifically teach the incorporation of one or more heater elements, wherein each heater element is integrated with one of the piezoelectric resonators. Furuki et al. do recognize the need for compensating for the effect of temperature on the stability of the resonator element of their disclosed device in determining the accurate measurement of oscillation frequency (see col. 12, lines 34 – 50). As evidenced by Bloch et al., the use of heater elements integrated with piezoelectric resonators are well known in the art for providing temperature stabilization (see Abstract) (see MPEP § 2144.03). Bloch et al. teach the use of an integrated contact heater element (52) for a piezoelectric quartz crystal resonator (12) in order to

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facilitate the temperature stabilization of the resonator crystal element (see col. 3, line 35 – col. 4, line 34; figure 3).



Hence, a person of ordinary skill in the art would have recognized the suitability of incorporating the use of an integrated heater element with a piezoelectric resonator, as taught by Bloch et al., with the detection apparatus of Furuki et al. for the intended purpose of providing for the temperature stabilization of the quartz resonator gas detecting element (see MPEP § 2144.07). Therefore, it would have been obvious to a person of ordinary skill in the art to use of an integrated heater element with a piezoelectric resonator, with the associated control circuitry, as taught by Bloch et al., with the detection apparatus of Furuki et al. in order to provide for the temperature stabilization of the quartz resonator element so accurate measurements could be performed.

Regarding claim 3, Furuki et al. teach the incorporation of a surface acoustic wave (SAW) vibrating or resonating element (see col. 5, line 65 – col. 6, line 2). Regarding claim 6, as illustrated in figure 1, Furuki et al. teach that the sensor coating disposed on the resonator (gas detecting element 1) is capable of fluorescing or phosphorescing and in which the apparatus further includes an optical source (light emitting element 6) and an optical detector (light

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receiving element 9) arranged to probe the fluorescing coating (see col. 5, lines 1 – 64; col. 10, lines 13 – 46; figure 1).

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuki et al. and Bloch et al., as applied to claims 1 – 3 and 6 above, and further in view of Neuberger (U.S. Pat. No. 5,065,140). Neither Furuki et al. or Bloch et al. specifically teach the incorporation of an alarm means. However, the use of alarms with gas sensing devices are well known in the art when these devices are utilized in the monitoring and detection of harmful or explosive gaseous substances (see MPEP § 2144.03). For example, Neuberger teaches an alarm means integrated with a gas sensing device incorporating the use of piezoelectric resonators for detecting harmful gases, such as HCl and other halogenated gases (see col. 3, lines 6 – 11; col. 4, lines 7 – 24). Furuki et al. do teach that their disclosed gas detection apparatus can be utilized in the detection of harmful gases, such as ammonia (NH₃) and carbon monoxide (CO) (see col. 5, lines 1 – 35). Consequently, a person of ordinary skill in the art would have recognized the suitability of utilizing an alarm means, as exemplified by Neuberger, for the intended purpose of indicating the presence of a harmful substance, such as mercury vapor, detected by the Furuki et al. and Bloch et al. gas sensing device (see MPEP § 2144.07). In addition, as evidenced by Neuberger, a person of ordinary skill in the art would accordingly have had a reasonable expectation of success of incorporating such an alarm means with a gas sensing device. The Courts have held that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. See *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986) (see MPEP § 2143.02). Therefore, it would have been obvious to a

person of ordinary skill in the art to incorporate such an alarm means, as taught by Neuberger, with the gas sensing apparatus of Furuki et al. and Bloch et al. in order facilitate the alarm indication of the detection of a harmful substance.

Allowable Subject Matter

Claims 10 – 18 are allowed.

Claims 5 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 5, the cited prior art neither teach or fairly suggest the further inclusion within the apparatus an external electrode arranged to set up an electrical field between one of the resonators and the external electrode. Regarding claim 7, the cited prior art neither teach or fairly suggest the further incorporation within the apparatus a piezoelectric resonator incorporating gold nanoparticles.

Regarding claim 10, the cited prior art neither teach or fairly suggest a method for identifying a biological or chemical agent, wherein the method comprises the steps in sequence of: (a) selecting an array of piezoelectric resonators operating in a mode selected from the group consisting of a single mode and a dual mode, wherein at least one of the resonators comprise an integrated heater; (b) applying a sensor coating to two or more of the resonators, wherein the sensor coatings are collectively designed to differentially adsorb to one or more of the biological and chemical agents; (c) exposing the piezoelectric resonators to a substance containing one or more of the biological or chemical agents; (d) electrically exciting the piezoelectric resonators;

(e) activating the heater element; (f) measuring the frequency and impedance of the piezoelectric resonators; (g) measuring the temperature from the heater element; (h) analyzing the data collected from steps (f) and (g); and (i) using the results of step (h) to identify a specific biological or chemical agent.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Mays, Jr. teaches a luminescent piezoelectric detection system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines, Ph.D. whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11:30 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

